Comparison of Beach Profile Change and Migration of Vegetation Belts at Sand Barrier in Nakdong River Estuary, Korea

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ABSTRACT

This study discusses characteristic of beach profile change and movement of vegetation belts at the sand barrier in the Nakdong river estuary, Korea, focusing on geomorphologic evolution and mobility of sand barriers in the view of coastal engineering. We carried out topography surveying with total station and level instrument and observed profile change of Jinu-do between 2008 and 2010. We set up representative profiles of all survey points and analyzed volume change at twelve representative profiles and migration distance of vegetation belt. Main results obtained are summarized as follows: (1) Representative profile showed maximum volume change from Profile-1 to Profile-12. Profile-3 had maximum volume change and Profile-6, located at the center of Jinu-do, had minimum volume change. Results of daily average change velocity at Jinu-do, Profile-3 is 0.140 cu. m/m/day and Profile-6 is -0.013 cu. m/m/day, respectively. (2) Beach profiles of Jinu-do show sediment deposited in the direction to east and west with Jinu-do as the center. In Profile-6, yearly average deposited volume of representative profiles estimated 298.28 cu. m/m (3) Maximum migration distance of vegetation belt is 33.17 m. Except for Profile-9 and Profile-12, the other vegetation belt growth is toward offshore.

KEY WORDS: Nakdong river estuary, Beach profile change, Topography survey, Volume change, Migration of vegetation belt

INTRODUCTION

For existing research of Beach profile change, natural beach profile changes generally according to the seasons, but maintains an overall equilibrium, reaching a stable state in comparison with annual sediment budgets. However, coastal area adjacent estuary is different from a natural beach because complex hydraulic characteristics changed by a lot of sediments, wave, current, and wind. Those bring about more complicated coastal morphological change.

The Nakdong estuary in Figure 1, a representative estuary of South Korea, can be divided into three tidelands that connect two islands (i.e. Myungji-do, Eulsook-do) formed by shoals in front of these islands (Oh, 2001). After the construction of the Nakdong estuary bank, the sand barriers in the estuary changed greatly, and they are continuously developing their directions towards the open sea (Busan Metropolitan City, 2004). Accordingly, the artificial development of the coastal area changes the hydraulic characteristics of the Nakdong River and Jinhae bay, which is near the Nakdong estuary. Hence, it is expected that the sedimentary environment will be greatly changed (Kim and Ha, 2001).

Fig. 1 Location of Nakdong river estuary, Korea.

When studying the results from past researches related to the topographical changes of the Nakdong river estuary, it is clear that many studies from various disciples were conducted. Kim and Park (1980) and Kim and Ha (2001) analyzed the origin of sedimentation in the sand barriers by analyzing the minerals of the surface sediments...